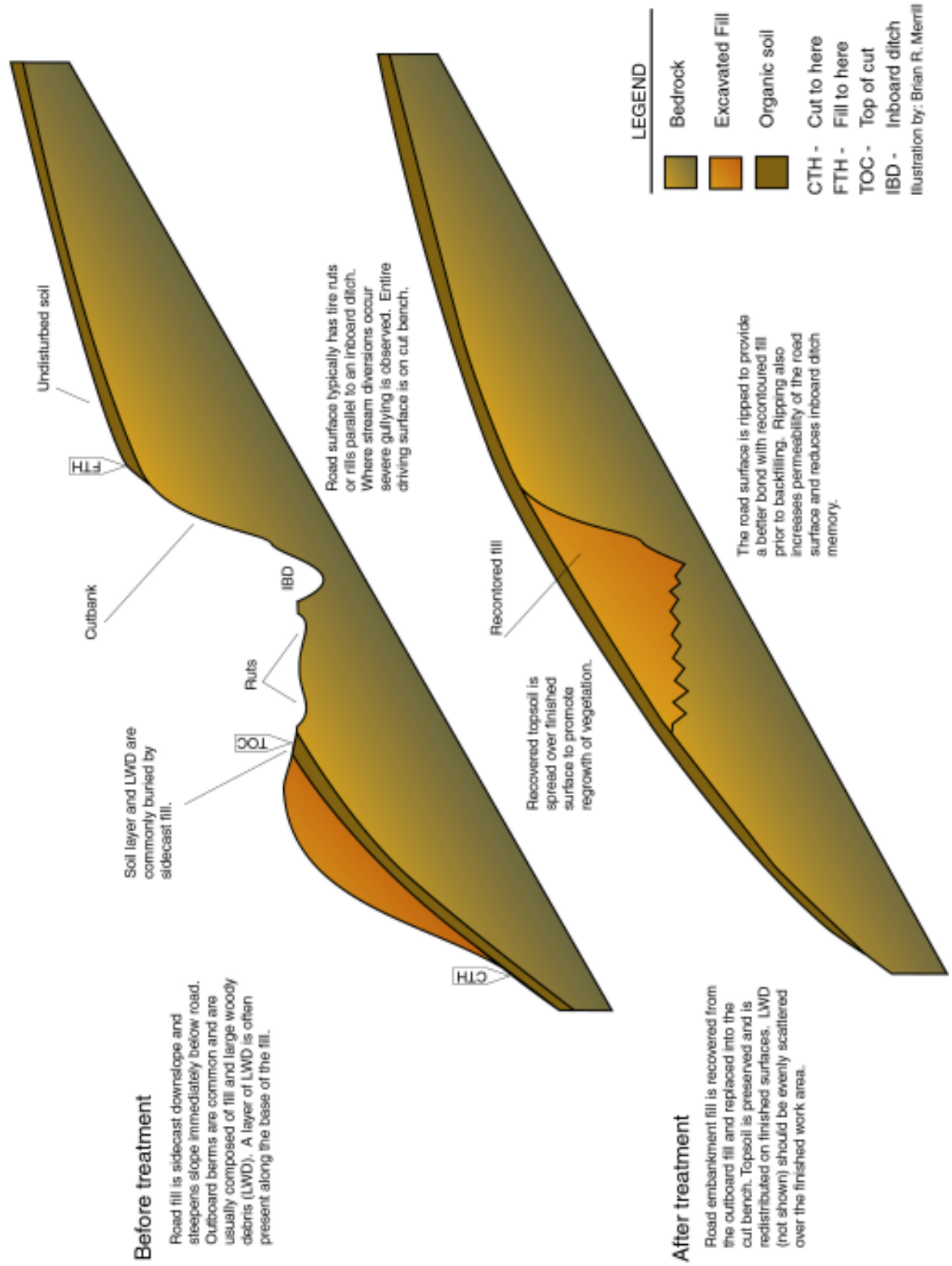


Full-Cut Bench Road Recontour - Convex Slope

Cross Section Cutaway

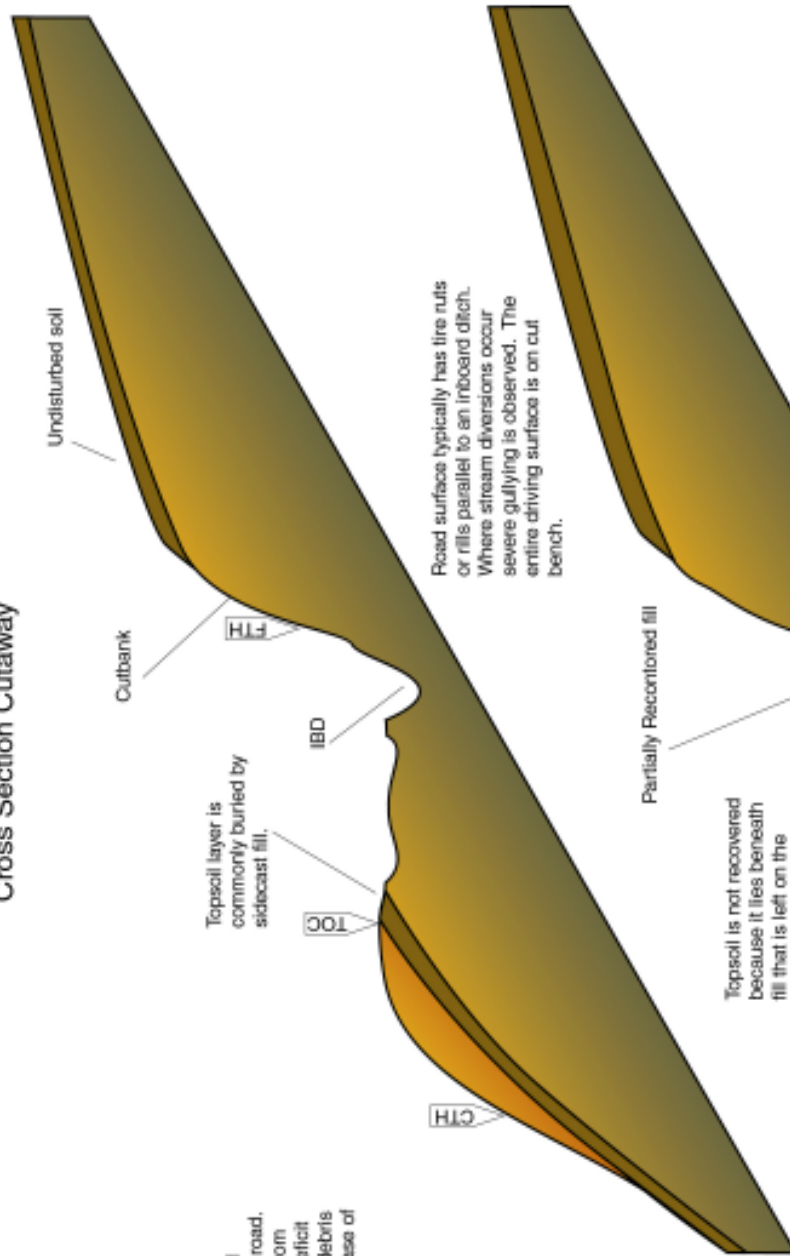


Partial Road Recontour - Convex Slope

Cross Section Cutaway

Before treatment

Road fill is sidecast downslope and steepens slope immediately below road. Where material has been eroded from road alignment, a recoverable fill deficit may exist. A layer of large woody debris (LWD) is often present along the base of the fill.



After treatment

Road embankment fill is recovered from the upper edge of the outboard fill and replaced into the cut bench. The outbank is backfilled to the prescribed height but remains exposed and unvegetated following treatment. Topsoil is not recovered. LWD (not shown) should be evenly scattered over the finished work area.

Partially Recontoured fill

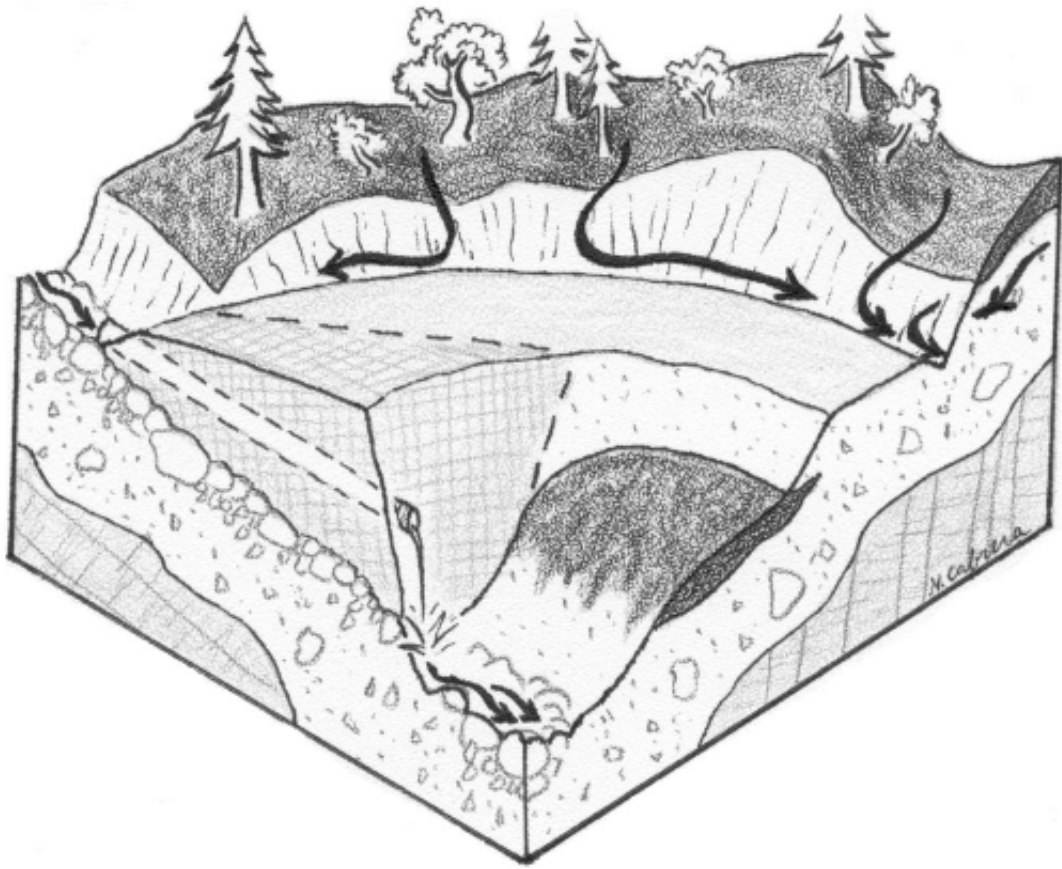
Topsoil is not recovered because it lies beneath fill that is left on the embankment.

The road surface is ripped to provide a better bond with recontoured fill prior to backfilling. Ripping also increases permeability of the road surface and reduces inboard ditch memory.

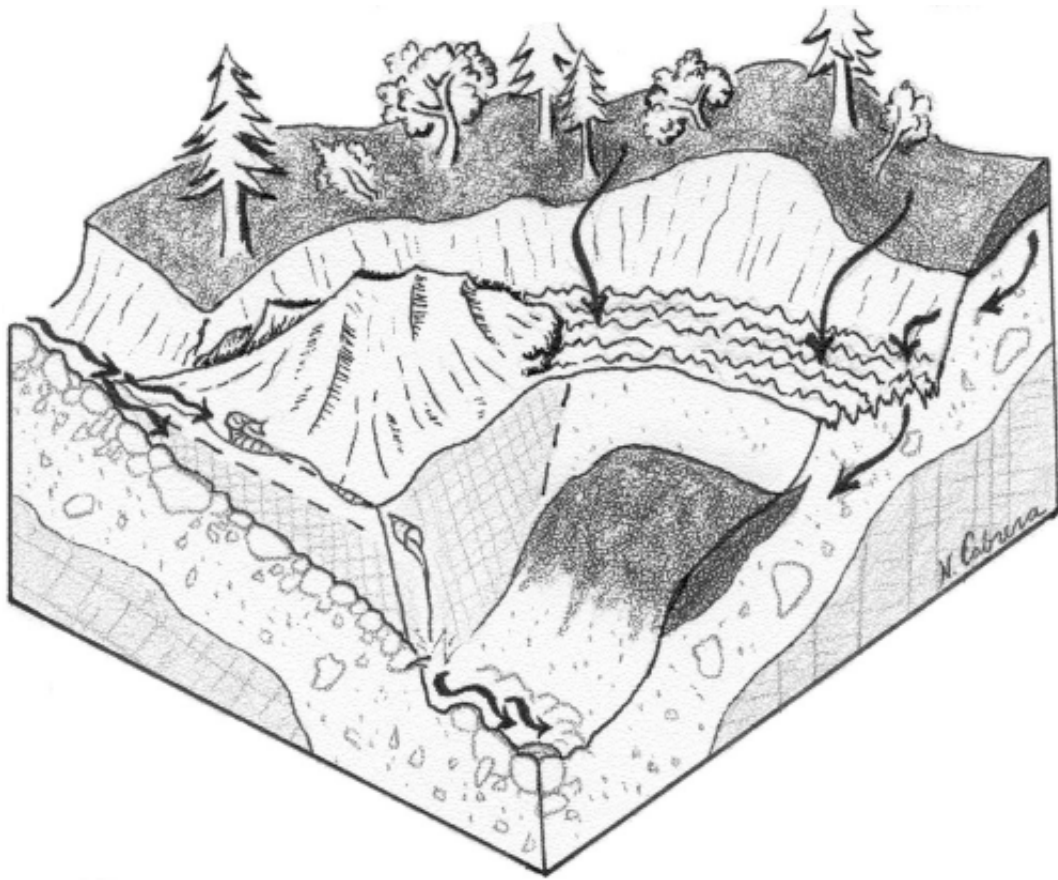
LEGEND

	Bedrock
	Excavated Fill
	Organic soil
CTH -	Cut to here
FTH -	Fill to here
TOC -	Top of cut
IBD -	Inboard ditch

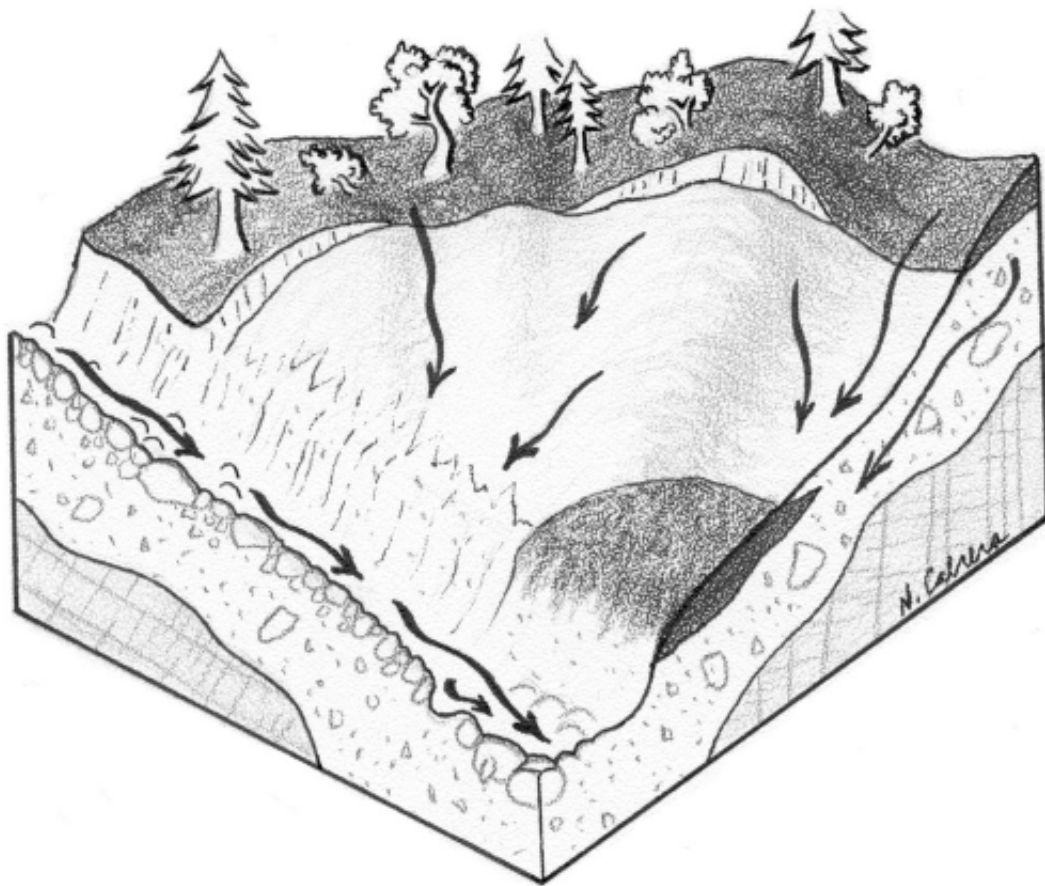
Illustration by: Brian R. Merrill



Crossings prior to treatment range in size from 100 to 2,000 cubic yards in volume. Most have culverts but some are older less stable Humboldt crossings. The culverts are susceptible to plugging from woody debris and sediment transported to the site from upstream. Road approaches that descend away from stream crossings pose a significant risk of flow diversion onto adjacent roads sections. Diversions can cause catastrophic mass wasting or severe gullyng along inter-fluvial slopes.



Following clearing operations, a dozer equipped with rippers decompacts the inboard ditch and cutbench portion of the adjacent road sections, to a minimum depth of 12 inches. The cutbank is stripped of all organic accumulations, using the dozer or the excavator or a combination of both. The dozer begins the excavation by pushing the crossing fill into the cutbank of the adjacent road sections, in maximum 6-inch lifts. The dozer continues to push material out of the crossing, compacting it in lifts until the material becomes too steep on which to operate; the dozer reaches the local Ordinary High Water elevation; or no more fill is available in the crossing. As the dozer cuts crossing fill, it leaves a berm on the downstream edge to prevent material from being sidecast downslope toward the stream. The excavator is used in tandem with the dozer to continue the crossing excavation.



The dozer and excavator continue to work in tandem until all crossing fill on the adjacent slopes has been removed. The excavation is designed to match the slopes and banks upstream and downstream from the crossing. The excavator makes final adjustments to the excavated stream crossing. The final surface is smoothed by back dragging with the dozer or the blade attached to the excavator bucket.

Road sections immediately adjacent to stream crossings are not be fully recontoured. Instead, the embankment fill would be removed and the exposed cutbank would only be partially recontoured. The partial filling against the cutbank would slowly be tapered to full recontour as the equipment moves away from the channel. This would reduce the slope on each side of the crossing, lessening the chance for direct sediment delivery if a post-treatment slope failure occurs.